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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,010	01/23/2002	Toru Tanikawa	23700.00110	1307

7590 01/21/2005  
Sunday Yokubaitis  
Crosby, Heafey, Roach & May  
P.O. Box 7936  
San Francisco, CA 94120-7936

EXAMINER  
TUGBANG, ANTHONY D

ART UNIT 3729	PAPER NUMBER
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DATE MAILED: 01/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/994,010

Applicant(s)

TANIKAWA ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 October 2004.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 8-10 and 12-14 is/are pending in the application.  
4a) Of the above claim(s) 14 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 8-10, 12 and 13 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☒ Certified copies of the priority documents have been received in Application No. 09/423,793.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. The applicant(s) amendment to the claims filed on 10/29/04 and the amendment to the specification and drawings filed on 5/19/04, each have been fully considered and made of record.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### *Election/Restrictions*

3. Claim 14 continues to stand as being withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6. NOTE: In the amendment filed on 10/29/04, Claim 14 was not present and the examiner presumes that Claim 14 is still pending.

### *Drawings*

4. The drawings/replacement sheets for Figures 4 and 10-12 were received on 5/19/04. These drawings have carefully been reviewed and approved by the examiner.

### *Claim Objections*

5. Claim 8 is objected to because of the following informalities: the phrase of "its thickness" (line 22) should be replaced with --the thickness of the first sheet--. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

6. Claims 8-10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Okawa et al 5,639,508.

Okawa discloses a method of manufacturing a piezoelectric actuator comprising: a first process for forming a first sheet (bottom layer 40 in Fig. 4) formed of piezoelectric ceramic pliant materials and a second sheet (top layer 40) formed of pliant predetermined materials of piezoelectric ceramic; forming an upper electrode layer (top electrode layer 42 in Fig. 4) on one surface of the first sheet; forming a lower electrode layer (either one of bottom electrode layer 40 or layer 44) on the other surface or opposite surface of the first sheet; a second process for piling and densifying or drying the first and second sheets having the lower electrode layer between (see col. 5, lines 8+); a third process for polarizing the first sheet in a thickness direction of the first sheet (see col. 5, lines 65+); a fourth process for patterning the upper electrode layer 42 in order to form multiple electrodes corresponding respectively to each of the pressure chamber (32a, 32b, 32c) of the pressure chamber forming unit, which meets all of the limitations of the claimed invention.

With respect to the first and third processes (detailed recitations at lines 11-13 and lines 20-22 of Claim 8), Okawa further teaches that the piezoelectric material is used as the material of the second sheet and another electrode layer (middle layer 40 or layer 54) is utilized for polarization of the conductive material on the surface sides of the second sheet and a voltage is placed between the upper electrode layer 42 and the electrode layer (either 40 or 54) for polarization where at least the first sheet is polarized (see col. 6, lines 3+).

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Regarding Claim(s) 9, within the second process, Okawa further teaches a pliant third sheet (middle layer 40) in which openings 52 are provided and the third sheet is piled on one surface side of the first sheet and is densified or dried with the first and second sheets.

Regarding Claim(s) 10, within the fourth process, Okawa further teaches that one surface side of the first sheet is conducted with the patterning of the upper electrode layer so that the first sheet will be separated by openings 52 corresponding respectively to each of the pressure chambers 32a, 32b, 32c.

***Claim Rejections - 35 USC § 103***

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okawa et al.

Okawa, as relied upon above in Claim 12, teaches the claimed manufacturing method further including that on the other surface side of the lower electrode layer is a vibrator 35 that generates the pressure for ejecting the ink in the pressure chamber during operation. Okawa does not appear to teach that the lower electrode layer is formed thicker than the upper electrode layer.

The dimension of relative thickness between the lower electrode layer and the upper electrode layer is considered to be an effective variable within the level of ordinary skill in the art in manufacturing electrode layers of piezoelectric actuators.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Okawa with a dimensional thickness of the lower electrode layer being greater or thicker than the dimensional thickness of the upper electrode layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Furthermore, the

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relative thickness claimed between the upper and lower electrode layers do not provide any manipulative difference within the manufacturing steps when compared with the prior art method of Okawa.

***Response to Arguments***

8. Applicant's arguments filed 5/19/04 have been fully considered, but have not been deemed to be found as persuasive.

In regards to the merits of Okawa et al as the examiner understands the applicant(s) response, it appears that the applicant(s) are arguing that Okawa does not teach "placing a voltage between said upper electrode layer and said electrode layer for polarization, said first sheet is polarized in the direction of the thickness" (lines 20-22 of Claim 8).

The examiner most respectfully disagrees. Okawa describes a power source that applies a voltage for polarization between electrode layers 42 and 44 (see col. 6, lines 34-40) where this location of voltage between layers 42 and 44 would also be between the upper electrode layer 42 and the electrode layer (either one of layer 54 or middle layer 40 in Figs. 4 and 5). It is noted that applicants argue that in their invention, the voltage is place between "both ends of the multi-layer plate or ceramic layers". However, this feature is not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

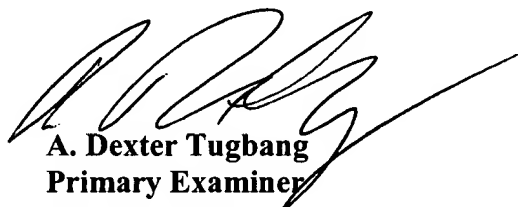
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570. The examiner can normally be reached on Monday - Friday 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**A. Dexter Tugbang**  
**Primary Examiner**  
**Art Unit 3729**

January 18, 2005